

Amendment under 37 CFR § 1.116
Application No. 10/506,537
Attorney Docket No. 042541

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REMARKS

Rejections under 35 USC §112

Claims 1-3, 5 and 6 were rejected under 35 USC §112, first paragraph, as failing to comply with the written description requirement. The Examiner alleged as follows:

Regarding Claim 1, applicant has amended this claim, and hence subsequent claims, to remove references to diffusion heat treatment. In applicant's discussion of these amendments in applicant's Response of 2 May 2006 at pages 4-6, applicant explains that the exemplified embodiment of the specification relates to diffusion heat treated articles. It is unclear, therefore, what is the grounds for supporting the claims as proposed without reference to diffusion heat treatment. The original disclosure relates to diffusion heat treated articles that result in alpha Cr phase, but it is unclear where layers having 85% or more are taught.

(Office Action page 2).

Accordingly, claim 1 has been amended to delete "with Cr content of more than 85%" and to recite "a multi-layer surface structure formed on the Ni-alloy substrate, the multi-layer surface structure being formed by Al-diffusing treatment of the Ni-alloy substrate containing Cr, or by Al-diffusing treatment of the Ni alloy substrate coated with a Cr-containing layer, comprising an inner Cr layer in the form of α -Cr phase composed of precipitates between the substrate and an outer layer and the outer layer composed of a β phase (Ni-Al-Cr) and a γ' phase ($\text{Ni}_3\text{Al}(\text{Cr})$), wherein the Al content in the outer layer is at least 20 atomic percent."

Thus, claim 1, as amended, complies with the written description requirement.

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Claims 1-3, 5 and 6 were rejected under 35 USC §112, second paragraph, as being indefinite.

Claim 1 has been amended delete "with Cr content of more than 85%" making the rejection moot.

Rejections under 35 USC §102(b)

Claims 1-3, 5 and 6 were rejected under 35 USC §102(b) as being anticipated by Rairden, III (U.S. Patent No. 3,998,603).

Claim 1 has been amended to recite "a multi-layer surface structure formed on the Ni-alloy substrate, the multi-layer surface structure being formed by Al-diffusing treatment of the Ni-alloy substrate containing Cr, or by Al-diffusing treatment of the Ni alloy substrate coated with a Cr-containing layer, comprising an inner Cr layer in the form of α -Cr phase composed of precipitates between the substrate and an outer layer and the outer layer composed of a β phase (Ni-Al-Cr) and a γ' phase (Ni₃Al(Cr)), wherein the Al content in the outer layer is at least 20 atomic percent."

As shown in the present Figs. 3-6, the α -Cr layer of the present invention is formed by precipitation of Cr between the body and the outer layer with Cr content of about 90%. Thus, α -Cr layer of the present invention differs from Rairden in the location and its Cr content. The α -Cr layer of the present invention is obtained when the base body is of Cr containing Ni alloy or of Ni alloy coated with Cr containing layer.

According to Rairden, a Ni-base or Co-base superalloy body is coated with a first coating of a composition in weight percent of 50-80% Ni and 20-50% Cr of uniform thickness. Then, on the resulting Ni-Cr coating, a coating of Al is coated and the resulting duplex coated superalloy

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body is subject to heat treatment diffusing Al into the Ni-Cr coating and forming a Cr diffusion barrier (claim 1 of Rairden).

From the description in Rairden at column 7, lines 4-9 and Fig. 3, Cr rich layer is located between aluminium rich (Ni-Al-Cr) layer on the surface side and the Ni-Cr coating layer. As shown in the attached explanatory drawing, this Cr rich layer appears as a result of decrease of Ni due to diffusion of Ni from the Ni-Cr coating to aluminium layer thereby relatively increasing the Cr content. The Cr content increase by this phenomenon will be about 50% at the most. There is no Cr precipitation in the Cr rich layer.

Thus, Rairden does not teach or suggest "a multi-layer surface structure formed on the Ni-alloy substrate, the multi-layer surface structure being formed by Al-diffusing treatment of the Ni-alloy substrate containing Cr, or by Al-diffusing treatment of the Ni alloy substrate coated with a Cr-containing layer, comprising an inner Cr layer in the form of α -Cr phase composed of precipitates between the substrate and an outer layer and the outer layer composed of a β phase (Ni-Al-Cr) and a γ' phase ($\text{Ni}_3\text{Al}(\text{Cr})$), wherein the Al content in the outer layer is at least 20 atomic percent."

For at least these reasons claim 1 patentably distinguishes over Rairden. Claims 2, 3, 5 and 6 also patentably distinguish over Rairden for at least the same reasons.

Double Patenting

Claims 3 and 6 were rejected under 35 USC 101 because these claim 6 is allegedly a substantial duplicate of claim 3.

Accordingly, claim 3 has been amended to distinguish from claim 6.

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In view of the aforementioned amendments and accompanying remarks, Applicants submit that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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